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10/086,685	03/04/2002	Alan H. Anderson	7707.0021-00	2825

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EXAMINER

FISCHER, JUSTIN R

ART UNIT	PAPER NUMBER
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1733

DATE MAILED: 03/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/086,685

Applicant(s)

ANDERSON ET AL.

Examiner

Justin R Fischer

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 21 December 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5,7,8,10-22,24,25,27-49 and 51-58 is/are pending in the application.
- 4a) Of the above claim(s) 34-47 and 57 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5,7,8,10-22,24,25,27-33,48,49,51-56 and 58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### DETAILED ACTION

1. Claims 6, 9, 23, 26, and 50 are cancelled per the amendment submitted on December 21, 2004.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-5, 7, 8, 10, 15-20, 48, 51-56, and 58 are rejected under 35 U.S.C. 103(a) as being anticipated by Benson (US 6,096,164, of record) and further in view of either one of Meyer (US 6,082,660, of record) or Knight (US 3,874,030, of record).

As best depicted in Figure 1, Benson is directed to a filament winding apparatus comprising (i) a spool section or cabinet 19 comprising at least one fiber bundle spool 18 and a winding head 9 comprising a spreading assembly 35, (ii) a transport or carriage 3 designed to longitudinally move said fiber spool section, and (iii) a controller or computerized system for applying said fiber bundle (Column 3, Lines 55-60). The apparatus of Benson includes a plurality of spreader bars (24-26) designed to spread and flatten the fiber bundle. While the bars are not depicted as being curved or bent, it is extremely well known in the winding industry to include at least one curved bar in order to promote spreading, as shown for example by Knight (Abstract) and Meyer

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(Figure 1 and Column 3, Lines 15-30). Thus, it is evident that the benefits of incorporating a curved bar are consistent with those desired by Benson and as such, one of ordinary skill in the art at the time of the invention would have found it obvious to form at least one of the spreading bars of Benson as a curved bar, there being no conclusive showing of unexpected results to establish a criticality for the claimed arrangement.

It is initially noted that while the apparatus of Benson is described as a filament placement apparatus, said apparatus is clearly capable of carrying out a filament winding technique and thus can be viewed as a filament winding apparatus. In particular, applicant contends that a filament winding apparatus performs without contact between the application section and the mandrel while a filament placement apparatus includes contact between a compaction roller and the mandrel. The examiner respectfully disagrees. The mere presence of a compaction roller does not preclude the apparatus of Benson from functioning as a filament winding apparatus (see Response to Arguments section below).

Regarding claim 2, the apparatus of Benson contains a mandrel 10 supported by a headstock 1 and a tailstock 2.

As to claim 3, Benson describes the inclusion of a series of redirects or idler rods to control the tension (Column 5, Lines 40-50).

With respect to claim 4, the arm of Benson supports the spool section and is seen to constitute an articulator.

Regarding claim 5, Benson includes a winding head or delivery head 9.

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As to claim 7, Figure 3 depicts the winding head as being enclosed within a frame. The figure further depicts a roller at the base of the frame and the outlet of the winding head is seen to constitute a winding eye.

Regarding claim 8, the fiber bundles pass through a plurality of spreading bars and rollers before being arranged on the mandrel in a side-by-side manner.

As to claim 10, Benson states that bar 26 can be kept stationary while moving bar 25. It is additionally noted that the fiber bundle passes between rollers 30 and 31, which would be expected to be rotated.

Regarding claims 15-18, and 31, Benson states that the winding apparatus is a completely computerized system and one of ordinary skill in the art at the time of the invention would have readily appreciated a design in which the computer (controller) controls each of the components of the winding apparatus.

As to claims 19 and 55, the winding apparatus of Benson is suitable for the application of fiber tows on a plurality of designs having a wide variety of shapes, including concave sides, convex sides, truncated sides, and uneven sides. Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to form a plurality of structures using the apparatus of Benson, including fuselages, it being well-known that fuselages are commonly formed with such an apparatus.

Regarding claim 20, the apparatus is clearly capable of applying a fiber gauge tow of less than 0.0038 inches.

Regarding claims 48 and 58, the headstock and tailstock are seen to represent a first providing component that supports or provides a mandrel and the carriage is seen

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to constitute a second providing component that provides at least one spool configured to travel along a path parallel to the axis of the mandrel. The fiber bundles are directed through a plurality of rollers and spreading bars, which are seen to constitute a feeding and conveying component. Lastly, as noted above, the winding apparatus of Benson includes a head 9, which is seen to constitute a first applying component.

With respect to claim 51, the apparatus of Benson provides a substantially uniform skin thickness.

As to claims 52-54, Benson states that the winding apparatus is suitable for laying fiber tows on geodesic compound shape forms (Column 2, Lines 65-67). It is noted that the apparatus of Benson is described as having the ability to apply a fiber bundle over an entire mandrel having a geodesic shape form (one can view each half of the mandrel as defining a section). As to claim 54, Benson states that a flat, geodesic, or complex compound shape form is suitable for the inventive apparatus and thus, the apparatus is configured to apply fiber bundles to a mandrel having a geodesic and non-geodesic component.

As to claim 55, the winding apparatus of Benson is suitable for the application of fiber tows on a plurality of designs having a wide variety of shapes, including concave sides, convex sides, truncated sides, and uneven sides. Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to form a plurality of structures using the apparatus of Benson, including fuselages, it being well-known that fuselages are commonly formed with such an apparatus.

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Regarding claim 56, the apparatus is clearly capable of applying a fiber gauge tow of less than 0.0038 inches.

4. Claims 11-14, 21, 22, 24, 25, 27-33, and 49 are rejected under 35 U.S.C. 103(a) as being unpatentable over Benson, Meyer, and Knight as applied in Paragraph 3 above and further in view of either one of Nakamura (US 4,921,557, of record) or Poulsen (US 3,886,029, of record).

In describing the fiber bundles (or fiber tows), Benson states that they are formed of pre-impregnated fibers. However, the pre-preg method (pre-impregnated fibers) and the wet fiber lay-up method are extremely well known in the winding industry and are commonly referred to as alternative winding techniques. In the wet lay-up technique, resin is applied to the fiber bundle after it has been delivered from the spool section as opposed to being applied prior to rolling onto the spool. Nakamura and Poulsen evidence the well-known technique in which a resin application system is arranged on the spool carrying carriage, in an analogous manner to the claimed invention. It is further noted that this is consistent with the carriage structure disclosed by Benson, particularly the inclusion of a spool section on a slidable carriage assembly. Thus, it would have been obvious to one of ordinary skill in the art at the time of the invention to include a resin application system in the apparatus of Benson.

As to claims 12 and 28, the claimed structure represents a common way of applying resin to a fiber bundle in a winding apparatus. Poulsen provides one example of such a structure in which resin is transported (from a supply or container) through a hose or piping system to an outlet nozzle or resin dispenser.

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Regarding claims 13 and 29, Benson states that tackiness of tows increases with increased temperature (Column 2, Lines 45-55)- thus, by heating the resin, the tackiness of the tow would be increased as desired.

With respect to claims 14 and 30, Poulsen evidences the well-known use of a metering system when applying resin to a winding apparatus (Column 5, Lines 25-35).

As to claims 21, 24, 25, and 49, Benson in view of either one of Nakamura or Poulsen teach the relevant structural components as set forth above.

With respect to claim 22, the delivery head 9 of Benson includes a wrist 17 that is configured to rotate said winding or delivery head.

Regarding claim 27, as noted above, Benson states that bar 26 can be kept stationary while moving bar 25. It is additionally noted that the fiber bundle passes between rollers 30 and 31, which would be expected to be rotated.

As to claim 32, the winding apparatus of Benson is suitable for the application of fiber tows on a plurality of designs having a wide variety of shapes, including concave sides, convex sides, truncated sides, and uneven sides. Thus, one of ordinary skill in the art at the time of the invention would have found it obvious to form a plurality of structures using the apparatus of Benson, including fuselages, it being well-known that fuselages are commonly formed with such an apparatus.

Regarding claim 33, the apparatus is clearly capable of applying a fiber gauge tow of less than 0.0038 inches.



***Response to Arguments***

5. Applicant's arguments filed December 21, 2004 have been fully considered but they are not persuasive.

Applicant initially contends that Benson discloses only a fiber placement machine, which is significantly different from filament winding machines. Applicant further states that contact is present between a compaction roller and the mandrel in a filament placement machine while such a contact is not present in a filament winding apparatus. The examiner respectfully disagrees. The mere presence of a compaction roller does not preclude the apparatus of Benson from functioning as a filament winding apparatus. For example, Weingart (US 4,869,761, newly cited) discloses a "filament winding apparatus" in which a compaction roller 84 makes contact with the mandrel. It is agreed that a filament winding apparatus and filament placement apparatus are not identical; however, the apparatus of Benson is clearly capable of functioning as a filament winding apparatus.

In regards to the inclusion of curved rods, applicant merely argues that Benson fails to teach such a construction. It appears that applicant accidentally overlooked the previous rejections with Knight and Meyer (Paragraph 5) in which the examiner set forth the position that curved rods are extensively used in the application of fiber materials to promote a desired spreading. As amended, claim 1 incorporates the previous limitations of dependent claims 6 and 9- thus, the previous rejection has been maintained as no persuasive argument has been presented by applicant.

As to the inclusion of a resin applicator or a "second applying component configured to apply resin to the fiber bundle", it is agreed that Benson expressly suggests the use of prepegs tows; however, such a disclosure does not exclude the use of additional, well-known techniques, such as wet-fiber lay-up. As detailed in the previous office action, the pre-preg method (pre-impregnated fibers) and the wet fiber lay-up method are extremely well known in the winding industry and are commonly referred to as alternative winding techniques. In the wet lay-up technique, resin is applied to the fiber bundle after it has been delivered from the spool section as opposed to being applied prior to rolling onto the spool. Nakamura and Poulsen have been applied to evidence such a technique in a similar fiber application system. Additionally, "Filament Winding" (Page 103) has been referenced to further evidence the extremely well known use of each of the above noted techniques in basic filament reinforcement assemblies. Thus, it is clearly evident that the respective methods are extremely well known and alternatively used in a variety of filament application systems.

Lastly, regarding the inclusion of a resin metering drum, Poulsen teaches the use of a piping system from which resin is metered to the upper surface of the mandrel (Column 5, Lines 35-35). It is evident that the resin is located in some form of holding tank or drum and applied according to a desired amount (metered). Thus, the method of Poulsen includes the transfer of a metered amount of resin to the dispensing section.

### ***Conclusion***

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP

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§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to **Justin R Fischer** whose telephone number is **(571) 272-1215**. The examiner can normally be reached on M-F (7:30-4:00).


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Blaine Copenheaver can be reached on (571) 272-1156. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Justin Fischer

March 15, 2005

  
JEFF H. AFTERGUT  
PRIMARY EXAMINER  
GROUP 1300